MATTEL ELECTRONICS®

SERVICE MANUAL

SYNSONICS™ DRUMS

MODEL 5281

MATTEL ELECTRONICS
5150 Rosecrans Avenue
Hawthorne, California 90250

SYNSONICS DRUMS

SERVICE MANUAL

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TOOLS and TEST EQUIPMENT REQUIRED

- Basic Electronic Hand Tools
- 10MHz Triggered Oscilloscope
- Stereo Audio Amplifier and Speakers
- Digital Multimeter (DMM)
- (6) 1½ V Alkaline C-size Batteries, or
- 9 VDC Power Supply

OPERATING INSTRUCTIONS

To Play Drums:

1a. Plug stereo headphones into the HEADPHONE jack of the Synsonics Drums or,

b. Using RCA phono cables, plug the OUTPUT jacks of the Synsonics Drums into the Aux in or Tape in jacks of a stereo amplifier. Turn the Selector knob or the Tape selector to choose the Synsonics Drums as the signal source.

2. Turn OFF/ON/VOLUME control to ON and set Volume to mid-position. Set the Volume control on the stereo amplifier to mid-position.

3. Strike the four drum pads with fingers or drum sticks. The harder the drum pads are hit, the louder the sound produced.

4. Another way to produce drum sounds is with the drum control keys. Each group of three keys corresponds to one of the four drum sounds. The first (left) key in each group will give a slow drum roll; the second (middle) key will give a medium speed drum roll; the third (right) key will give a fast drum roll.

5. The Bass Drum may be played by pressing the BASS OFF/ON key. Pressing this key a second time will turn off the bass drum.

6. For a closed cymbal or "high hat" sound, hold down the ACCENT key while striking the Cymbal drum pad or pressing one of the three Cymbal control keys.

7. Tom Tom 1 can be tuned over a 5 octave range. Adjust the TUNING control on the left side of the unit, while striking the Tom Tom 1 drum pad, until you reach the desired pitch.

8. The tempo, or speed, of the bass drum can be varied by pressing the TEMPO SLOWER or FASTER control keys. Hold down either Faster or Slower key to produce a gradual speeding up or slowing down of the tempo. When the bass drum reaches the desired tempo, release the key.

To Record:

1. There are 3 separate memories in the Synsonics Drums. Each memory consists of a 16 beat loop, with each beat counted off by the bass drum. The duration of a memory loop is determined by the Tempo of the bass drum.

2. To start recording, hold down the Record key while pressing one of the 3 Memory keys. The 3 Cymbal keys double as memory keys. Release the Record and Cymbal (Memory) keys.

3. After a ½ second delay, all 5 LEDs will light to indicate the recording process has started. Strike any of the drum pads and/or any of the drum control keys to record their sound in memory.

WHEN USING THE DRUM PADS TO RECORD, BE SURE TO STRIKE THEM HARD ENOUGH TO LIGHT THE LEDs. If an LED does not light, the sound for that drum has not been recorded.

4. After 16 beats, the memory will return to the first beat of the loop. It then replays the pattern you recorded, adding to it any new beats you may play. When a loop replays, you will hear everything recorded in previous loops.

5. The memory loop will repeat until halted by pressing STOP. Once you press STOP, you cannot add to a memory loop. The next time you activate record in that memory, it will be erased to make room for a new pattern.

ALL MEMORIES ARE AUTOMATICALLY ERASED WHEN THE SYNSONICS DRUMS IS TURNED OFF.

To Playback From Memory:

1. Hold down the PLAYBACK key while pressing one of the 3 Memory keys. Remember that the 3 Cymbal keys double as memory keys. The drum sequence stored in that memory will immediately start playing back.

2. Pressing TEMPO SLOWER or FASTER will gradually change the overall tempo, or speed, of playback.

3. The Synsonics Drums will continue to play back the memory loop until the STOP key is pressed. Pressing STOP to end playback will not erase the contents of a memory.

FOR ADDITIONAL INFORMATION CONCERNING THE OPERATION OF THE SYNSONICS DRUMS, REFER TO THE OWNER'S OPERATING INSTRUCTIONS.

SYNSONICS DRUMS TECHNICAL DESCRIPTION

The Synsonics Drums is a musical instrument which electronically synthesizes the percussive sounds of the cymbal, snare drum, 2 different tom tom drums, and a bass drum. Additionally, three memories are provided to allow the storage of drum patterns.

Referring to the Synsonics Drums schematic (Figure 4), a 9-volt source, available from internal batteries or from an optional external source, powers the unit. The power source is fed to polarity protection diode D28 and to power switch S1. A unique circuit, called a DC to DC converter, is composed by Q5, Q6, T1, R78, C34, R77, and other associated circuitry. These components form an oscillator operating at about 100KHz. T1, being multi-tapped, has various voltages available at its secondaries. These voltages are rectified and filtered, generating the +9 VDC, +5 VDC, and -9 VDC needed to operate the various circuitry. Overvoltage protection zener diode VR1 senses the -9 VDC line, so that if peaks exceed -10.4 V, increased negative bias on NPN transistor Q5 will decrease the output voltage.

A technique called multiplexing is used several times in the Synsonics Drums. In multiplexing, one line or group of lines is able to carry signals for use by different parts of the system at different times. For example, output lines E0 - E3 lead to the Random Access Memory (RAM) U2, and also to the keypad matrix on the upper left side of the schematic. RAM U2 and the keypad matrix share lines E0 - E3. Part of the time U2 is sending interrogation pulses to the keypad, and the rest of the time it is sending addresses to RAM U2.

There are four inputs (E0 - E3) and four outputs (G0 - G3) to the keypad matrix, allowing 16 possible combinations. These lines are multiplexed, but differently from the procedure just described. When U1 scans the keypad, an interrogation pulse is sent along line E0 first. A very short time later, a pulse is sent along line E1, likewise for E2 and E3, and then back to E0. U1 senses which keypad buttons are pressed by looking at lines G0 - G3. For example, the Tom Tom 1 Fast button is depressed. An interrogation pulse sent along line E2 is then coupled to line G1. Microprocessor U1 has been programmed to know that if G1 is enabled when E2 is interrogated, then the Tom Tom 1 Fast button has been depressed.

The same process happens if more than one keypad button is depressed. For example, Cymbal Slow and Tom Tom 2 Fast are depressed. U1 first interrogates E0 and sees that G3 is enabled. U1 now knows that Cymbal Slow is depressed. In sequence, U1 then interrogates E1 and E2 but does not see any buttons depressed. Next, E3 is interrogated and U1 sees that G1 is enabled, and knows that Tom Tom 2 Fast has been depressed.

Other function buttons used are Stop (used during record or playback), Bass, and Accent (for Cymbal) which pull lines H0, H1, and H3 respectively, to ground. They are not part of the 4 x 4 matrix described above.

LED 1 through LED 5 illuminate any time that their drum function is played. The signal may originate from the four drum pads, keypad switches, or U2. Two things must happen for one of these LEDs to light: One, its interrogate line (E0 - E3, F0 for Bass LED) must be a logic low, and two, Q1 must be turned on. For example, if the Record keypad button were depressed, we would not want LED 2 to light. U1, then, would not enable Q1 if Record was depressed.

One signal source is the keypad matrix which has been already discussed. A second source

is the drum pads. Mounted directly below each drum pad is piezoelectric transducer. It converts mechanical movement (the striking of a drum pad) into an electrical voltage. The drum pads are input sources to the Drum Sound Generator IC U3. Signals from the drum pads going to Microprocessor U1 travel along the bi-directional Drum Sound Chip Bus at pins 6, 8, 15, and 17 of U3. The microprocessor is a digital device but the output of the piezoelectric transducers is analog. For recording, the drums pads must be hit hard enough to set latches in U3 at this bus. This is why the musician must hit the drum pads hard enough to cause the LEDs to light during recording. U1 tells the latches in U3 when to accept drum signals and when to reset their state by the Read/Write and Reset lines, respectively.

Clock signals for U1 are generated by C1 and R21 at approximately 150KHz. Custom-programmed Read Only Memory (ROM) within the U1 tells the microprocessor when and how to perform the various functions to make the Synsonics Drums operate. Among these functions are: Writing into and reading out of RAM U2, interrogating and sensing the keypad matrix, receiving and sending signals along the bi-directional Drum Sound Chip bus, setting the Tempo (faster or slower), and generating Accent and Bass Drum signals (these will be discussed next).

Signal input for Drum Sound Generator U3 may come from the four drum pads or from the keypad matrix or memory (both through U1). As stated before, signals from the drum pads travel to U1 through the Drum Sound Chip bus during record. The signal from the Cymbal travels to U1 only via pin 8 on U3, Snare travels to U1 only via pin 17 on U3, and so on. The same procedure follows during playback from U1: Cymbal travels to U3 only via pin 37 on U1, Snare travels to U3 only via pin 38 on U1, and so on.

Within U3 are Voltage Controlled Oscillators (VCO) and Voltage Controlled Amplifiers (VCA), all helping to create the unique sound of each instrument. The frequency of a VCO varies with changes in the DC control voltage applied to it. In a VCA, the gain is adjustable by varying a DC control voltage.

Following U3 are waveshaping circuitry and U7, a white noise generator. U7 produces the signal that gives the snare drum and cymbal their characteristic "hissing" sound. This noise source is coupled to the snare and cymbal outputs of U3 through Q3 (cymbal) and Q4 (snare).

Each output of U3 is at a very low level, on the order of 10 mV. Each output feeds some amplifying scheme to increase the level sufficiently to drive the next stage. Q7 amplifies the output of Tom Tom 1 and Q8 amplifies the output of Tom Tom 2. For Tom Tom 1, C12, R73, R72, C11, and R39 provide the waveshaping characteristics. For Tom Tom 2, R44, R86, C14, C13, and R43 provide the waveshaping characteristics. Q4 modulates the waveform produced by C9, R35, C10, and R36 with the hiss produced by U7. Q3 modulates the waveform produced by C6, R33, C7, and R34 with the hiss produced by U7. If Accent transistor Q2 is enabled, then C6 is damped by R32, shortening the time constant and making the characteristic "high hat" sound. Bass drum originates in U1 as a square wave and pulls C15 to ground through R26 and D24, forming a "thump" sound.

Cymbal and Tom Tom 2 are coupled to the Right Channel, while Snare and Tom Tom 1 are coupled to the Left Channel. Bass Drum is coupled to both the Left and Right Channels equally. Next in line are U4A and U4B which sum the various inputs on each channel and act as a low-pass filter.

The matrix formed by R48, R50, R51, and R52 allow about 20% of the signal on the Right Channel to blend with the Left Channel, and about 20% of the Left Channel to blend with the Right Channel. This provides a "surround" effect to the sound, simulating the effect that the ear further away from the sound source will hear less volume than the ear closer to the source. The Output Level Control adjusts the level to the output stages. C25 and C26 for U5 and C17 and C18 for U6 act as a bandpass filter to attenuate excessively low or high frequencies.

U5 (Left Channel) and U6 (Right Channel) amplify the signals to drive Headphones or any other external equipment (such as a guitar

amplifier or stereo system). R56 and C27 (Left Channel) and R59 and C20 (Right Channel) provide immunity from RF energy being sent to the output equipment. R55 and R57 (Left Channel) and R60 and R61 (Right Channel) reduces the signal from the Line Out jacks to line level.

PRELIMINARY CHECKLIST

Before you refer to the TROUBLESHOOTING section which follows, look at this list of possible solutions. Then, if any problem persists, you should be able to correct it by referring to the TROUBLESHOOTING section.

SYMPTOM	CHECK
1. No sound from Synsonics Drums unit, LEDs do not light.	Check that batteries are fresh and inserted correctly. Check that the correct external adaptor is used; the tip of the mini-plug must be positive, the ring (sleeve) must be ground.
2. No sound from Synsonics Drums unit, LEDs light when unit is played.	Check that amplifier is connected correctly and its Selector knob is switched to the correct position. Check that the Speaker switch on amplifier is activated. Check that batteries are fresh and inserted correctly.
3. Loud hum from Synsonics Drums unit immediately upon turn-on.	Make sure phono cables are fully inserted in jacks or try a new set of phono cables. If an external DC adaptor is used, it must be rated for 9 VDC at a minimum of 200 mA.
4. Low-volume hum is heard when Synsonics Drums unit is turned on.	Increase volume on Synsonics Drums unit and decrease volume on amplifier. Try a new set of phono cables. If using a DC adaptor, change C39 and C40 from 1 uF to 10 uF at 16 VDC if not previously completed.

ON-BOARD DIAGNOSTIC TEST ROUTINE

A program in microcomputer IC U1 will test U1, U2 (RAM), LED 1 - LED 5, and certain keypad buttons. It will not provide definitive test for U3 through U7.

PROCEDURE	RESULT
1. With power OFF, press the three Cymbal keypad buttons.	
2. Turn on power while holding down the three Cymbal keys.	All 5 LEDs turn on for 1 second.
3. Release the three Cymbal keys.	Snare LED goes out if U2 is OK. Tom Tom 2 LED goes out if memory in U1 is OK.

4. Press:
   - Stop ..... Only Cymbal LED lights.
   - Record ..... Only Snare LED lights.
   - Playback ..... Only Tom Tom 1 LED lights.
   - Slower ..... Only Tom Tom 2 LED lights.
   - Faster ..... Only Bass LED lights.
   - Bass ..... All 5 LEDs light for 2 seconds, then turn off.

DISASSEMBLY

1. Place the Synsonics Drums unit upside down (drum pads facing down), protecting it from scratches by a piece of cloth or piece of carpeting.
2. Remove 5 short and 3 long screws which attach the lower housing to the upper housing.
3. Lift lower housing straight up and away from the upper housing.
4. If using batteries for testing, wrap pieces of cellophane tape around them and the battery tray.
5. The PC Board may be lifted upwards without removing any connectors. To remove the PC Board, first disconnect J6 from its connector in the center of the PC Board.
6. To access the piezoelectric transducers, first lift the PC Board. Then, lift the suspect drum head and remove its four grommets. Separate the two halves with your fingers to reveal the transducer.
7. During reassembly, the wires in the ribbon cable must loop around the LEDs. Otherwise, the PC Board will not seat properly.

IMPORTANT: Damage to the Upper Housing will result if the screws are not replaced exactly as shown in the Exploded View (Figure 1).

DISASSEMBLY NOTES:

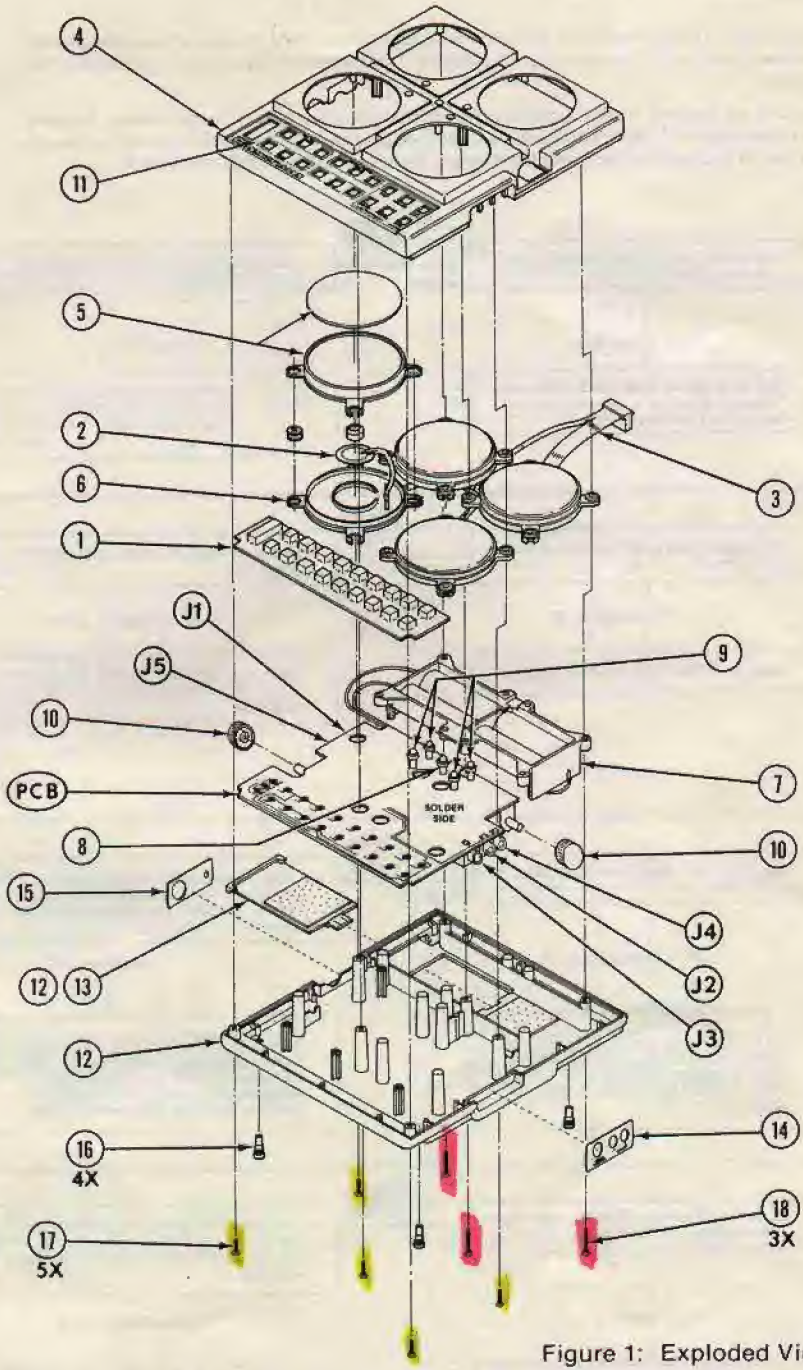
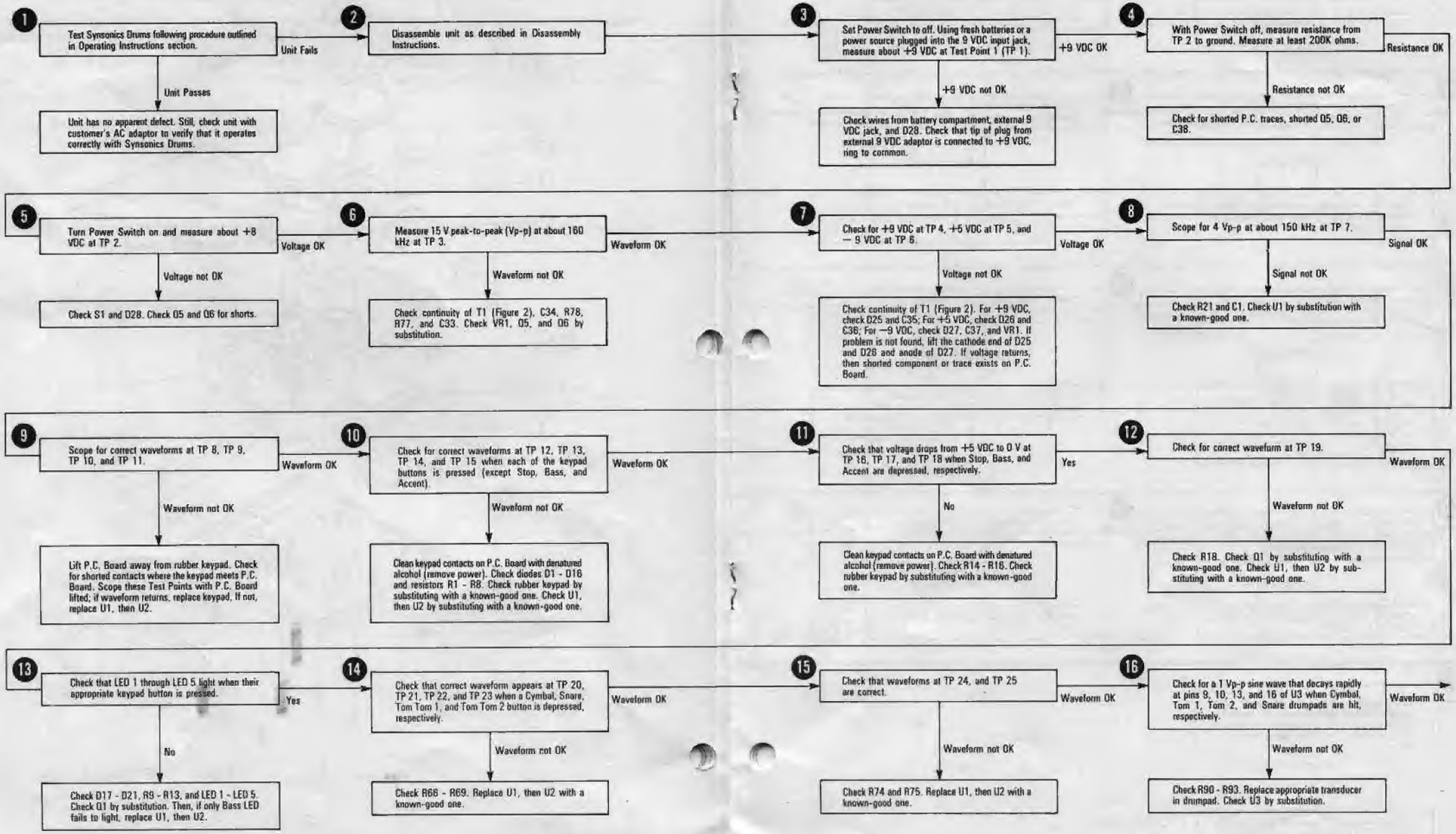


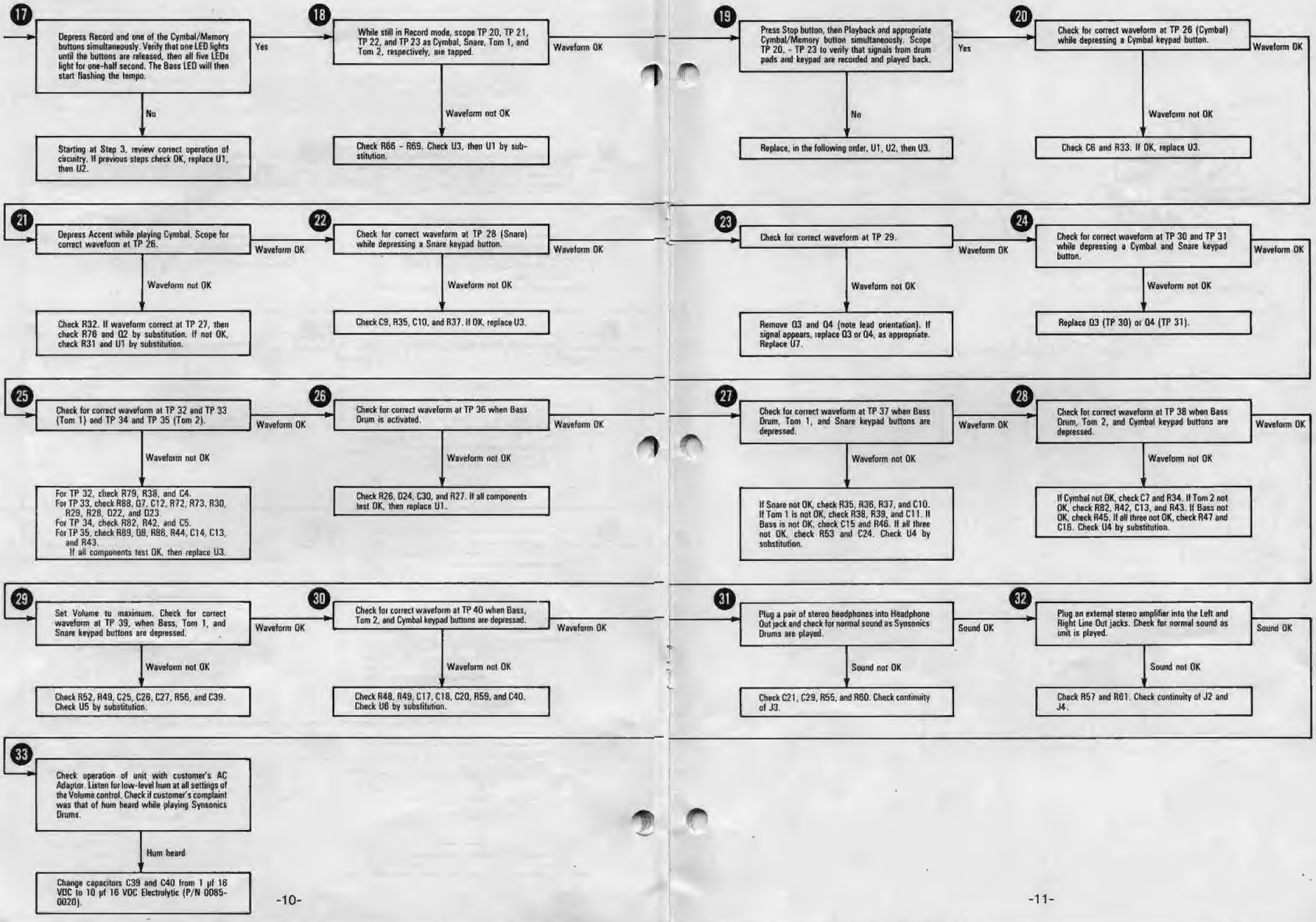
Figure 1: Exploded View

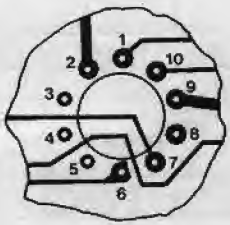
TROUBLESHOOTING:

Starting at Step 1, follow each test in numerical order. The correct voltage or waveform being measured will lead you to the next step; an incorrect measurement will lead you to the defective component.

Test the unit by placing it upside down (drum pads towards table) with the bottom housing removed. Clamp the P.C. Board against the upper housing with your fingers. You will be able to lift the front of the unit and activate the various drum pushbuttons and drum pads.




17
Depress Record and one of the Cymbal/Memory buttons simultaneously. Verify that one LED lights until the buttons are released, then all five LEDs light for one-half second. The Bass LED will then start flashing the tempo.
Yes
No
Starting at Step 3, review correct operation of circuitry. If previous steps check OK, replace U1, then U2.
18
While still in Record mode, scope TP 20, TP 21, TP 22, and TP 23 as Cymbal, Snare, Tom 1, and Tom 2, respectively, are tapped.
Waveform OK
Waveform not OK
Check R66 - R69. Check U3, then U1 by substitution.
19
Press Stop button, then Playback and appropriate Cymbal/Memory button simultaneously. Scope TP 20, - TP 23 to verify that signals from drum pads and keypad are recorded and played back.
Yes
No
Replace, in the following order, U1, U2, then U3.
20
Check for correct waveform at TP 26 (Cymbal) while depressing a Cymbal keypad button.
Waveform OK
Waveform not OK
Check C6 and R33. If OK, replace U3.
21
Depress Accent while playing Cymbal. Scope for correct waveform at TP 26.
Waveform OK
Waveform not OK
Check R32. If waveform correct at TP 27, then check R76 and Q2 by substitution. If not OK, check R31 and U1 by substitution.
22
Check for correct waveform at TP 28 (Snare) while depressing a Snare keypad button.
Waveform OK
Waveform not OK
Check C9, R35, C10, and R37. If OK, replace U3.
23
Check for correct waveform at TP 29.
Waveform OK
Waveform not OK
Remove Q3 and Q4 (note lead orientation). If signal appears, replace Q3 or Q4, as appropriate. Replace U7.
24
Check for correct waveform at TP 30 and TP 31 while depressing a Cymbal and Snare keypad button.
Waveform OK
Waveform not OK
Replace Q3 (TP 30) or Q4 (TP 31).
25
Check for correct waveform at TP 32 and TP 33 (Tom 1) and TP 34 and TP 35 (Tom 2).
Waveform OK
Waveform not OK
For TP 32, check R79, R38, and C4.
For TP 33, check R88, Q7, C12, R72, R73, R30, R29, R28, Q22, and Q23.
For TP 34, check R82, R42, and C5.
For TP 35, check R89, Q9, R86, R44, C14, C13, and R43.
If all components test OK, then replace U3.
26
Check for correct waveform at TP 36 when Bass Drum is activated.
Waveform OK
Waveform not OK
Check R26, Q24, C30, and R27. If all components test OK, then replace U1.
27
Check for correct waveform at TP 37 when Bass Drum, Tom 1, and Snare keypad buttons are depressed.
Waveform OK
Waveform not OK
If Snare not OK, check R35, R36, R37, and C10. If Tom 1 is not OK, check R38, R39, and C11. If Bass is not OK, check C15 and R46. If all three not OK, check R53 and C24. Check U4 by substitution.
28
Check for correct waveform at TP 38 when Bass Drum, Tom 2, and Cymbal keypad buttons are depressed.
Waveform OK
Waveform not OK
If Cymbal not OK, check C7 and R34. If Tom 2 not OK, check R82, R42, C13, and R43. If Bass not OK, check R45. If all three not OK, check R47 and C16. Check U4 by substitution.
29
Set Volume to maximum. Check for correct waveform at TP 39, when Bass, Tom 1, and Snare keypad buttons are depressed.
Waveform OK
Waveform not OK
Check R52, R49, C25, C26, C27, R56, and C39. Check U5 by substitution.
30
Check for correct waveform at TP 40 when Bass, Tom 2, and Cymbal keypad buttons are depressed.
Waveform OK
Waveform not OK
Check R48, R49, C17, C18, C20, R59, and C40. Check U6 by substitution.
31
Plug a pair of stereo headphones into Headphone Out jack and check for normal sound as Synsonics Drums are played.
Sound OK
Sound not OK
Check C21, C29, R55, and R60. Check continuity of J3.
32
Plug an external stereo amplifier into the Left and Right Line Out jacks. Check for normal sound as unit is played.
Sound OK
Sound not OK
Check R57 and R61. Check continuity of J2 and J4.
33
Check operation of unit with customer's AC Adaptor. Listen for low-level hum at all settings of the Volume control. Check if customer's complaint was that of hum heard while playing Synsonics Drums.
Hum heard
Change capacitors C39 and C40 from 1 µf 16 VDC to 10 µf 16 VDC Electrolytic (P/N 0085-0020).



T1 as seen from
solder side of PC Board.

Pins	Resistance
1-2	0.06 ohms
6-7	0.37 ohms
7-8	0.45 ohms
8-9	0.49 ohms
9-10	0.28 ohms

Figure 2: T1 In-Circuit Resistance

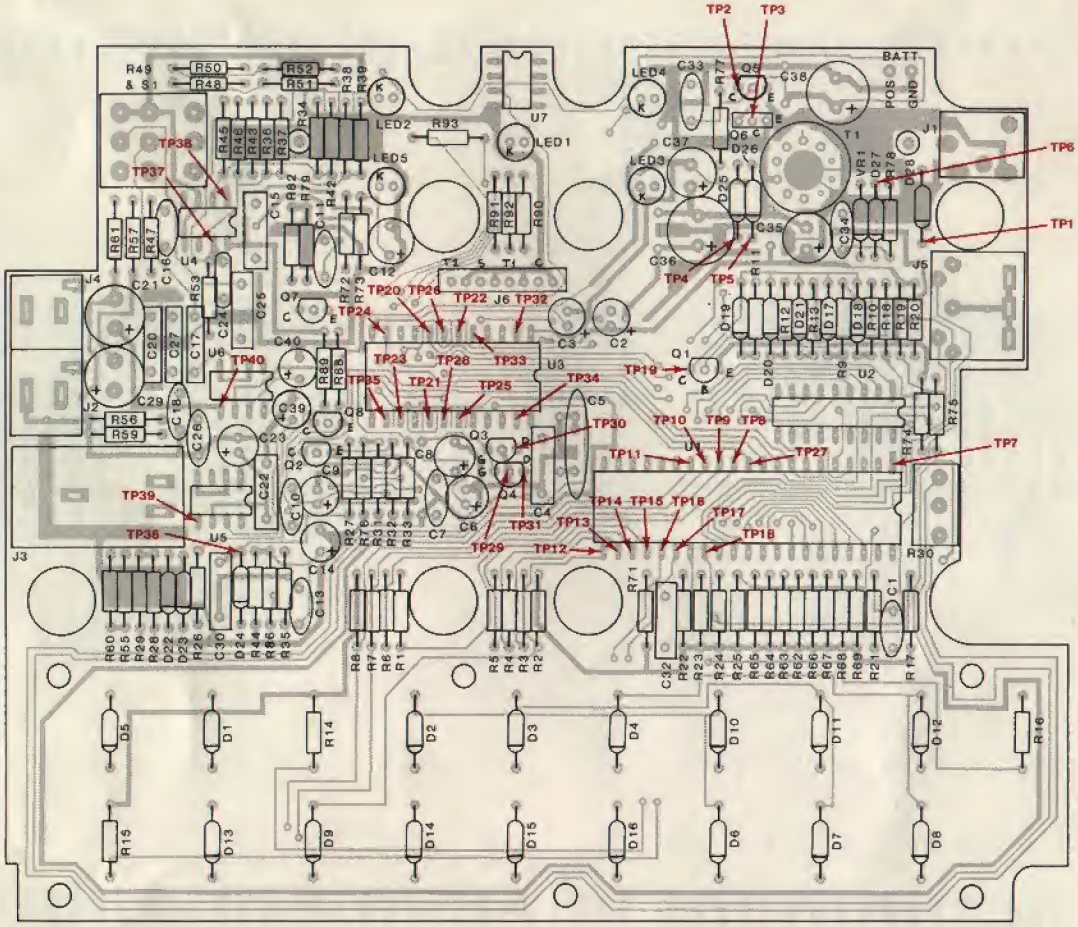
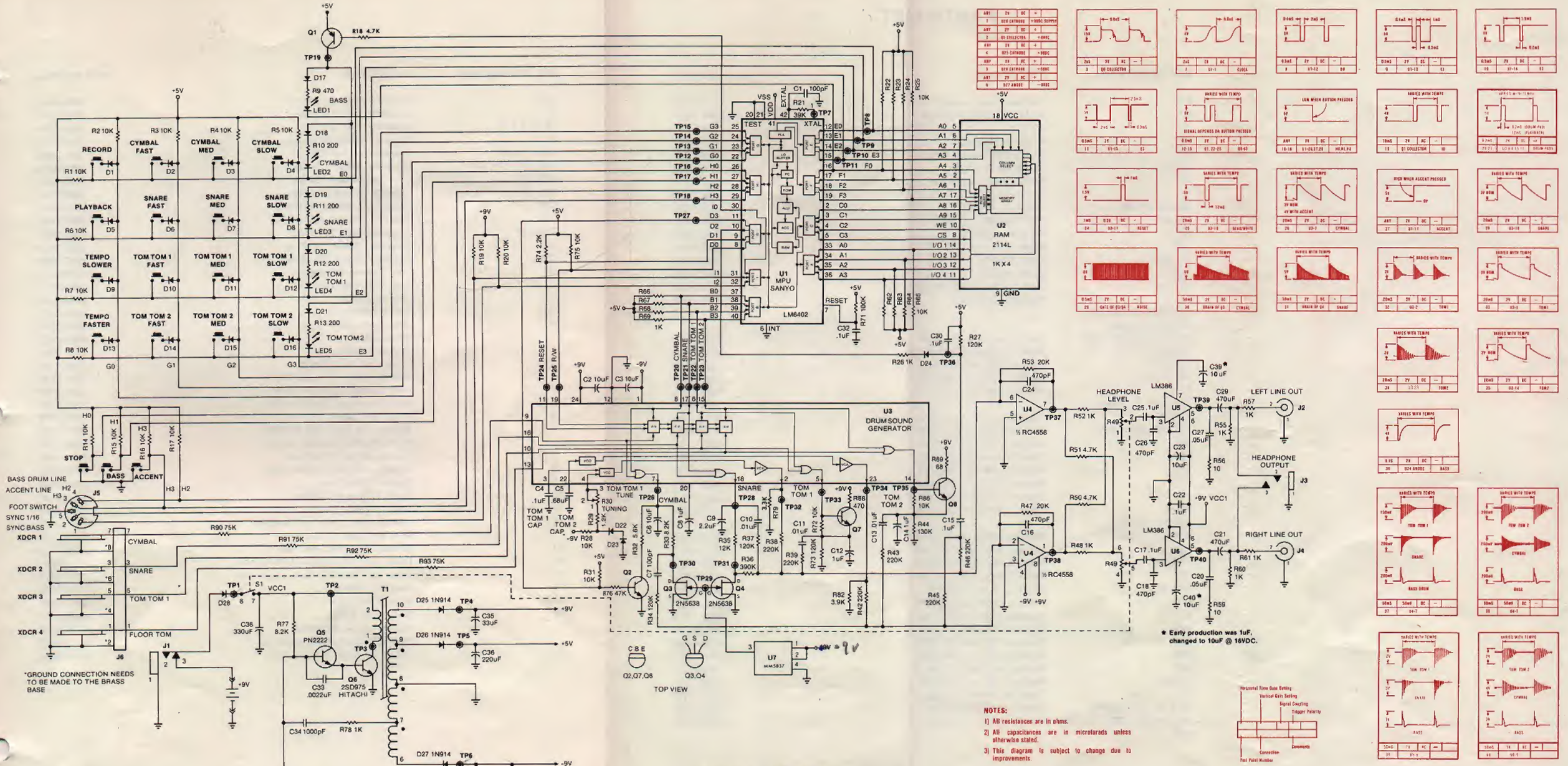


Figure 3: P.C. Board Component Layout

NOTES

b
1
6



NOTES:

1) All resistances are in ohms.
2) All capacitances are in microfarads unless otherwise stated.
3) This diagram is subject to change due to improvements.

Figure 4: Schematic

PARTS LIST

REF. DESIGNATION	DESCRIPTION	PART NUMBER
PCB	P.C. Board Assy, w/parts	5281-9159
U1	IC, LM6402 Microcomputer	5281-9019
U2	IC, 2114L Random Access Memory	0098-0710
U3	IC, Sound Generator	5281-2219
U4	IC, RC4558 Dual OP Amp	0098-1230
U5, U6	IC, LM386 Power Amp	0098-1020
U7	MM5837 Noise Generator	0088-0011
Q1	Transistor, PN2907	0099-1180
Q2, Q5, Q7, Q8	Transistor, PN2222	0086-0320
Q3, Q4	FET 2N5638	0086-0346
Q6	Transistor, 2SD975	0086-0343
VR1	Diode, Zener, HZ11B1	0086-0439
D1-D27	Diode, 1N914	0099-1040
D28	Diode, 1N4001	0099-1030
LED 1-5	Light Emitting Diode, MV5053	0086-0437
T1	Transformer, TY77	0089-0554
R1-8, R14-17, R19-20 R22-25, R28, R31		
R62-69, R72, R75, R86	Resistor, 10K ohm 5% 1/4W	0095-1020
R9, R88	Resistor, 470 ohm 5% 1/4W CF	0095-0701
R10-R13	Resistor, 200 ohm 5% 1/4W	0095-0610
R18, R50-51	Resistor, 4.7K ohm 5% 1/4W	0095-0940
R21	Resistor, 39K ohm 2% 1/4W CF	0084-0441
R26, R55, R57, R60, R61, R78	Resistor, 1K ohm 5% 1/4W	0095-0780
R27, R34, R37, R73	Resistor, 120K ohm 5% 1/4W	0095-1280
R29	Resistor, 1.2K ohm 5% 1/4W	0095-0800
R30	Potentiometer, 50K (Tuning)	0084-1360
R32	Resistor, 5.6K ohm 5% 1/4W	0095-0960
R33	Resistor, 8.2K ohm 5% 1/4W	0095-1000
R35	Resistor, 12K ohm 5% 1/4W	0095-1040
R36	Resistor, 390K ohm 5% 1/4W	0095-1400
R38-39, R42-43, R45-46	Resistor, 220K ohm 5% 1/4W	0095-1340
R44	Resistor, 130K ohm 5% 1/4W	0095-1290
R47, R53	Resistor, 20K ohm 5% 1/4W	0095-1090
R49	Potentiometer, 10K ohm (Volume) w/switch	0084-1370
R56, R59	Resistor, 10 ohm 5% 1/4W	0095-0300
R71	Resistor, 100K ohm 5% 1/4W	0095-1260
R74	Resistor, 2.2K ohm 5% 1/4W	0095-0860
R76	Resistor, 47K ohm 5% 1/4W	0095-1180
R79	Resistor, 3.3K ohm 5% 1/4W	0095-0900
R82	Resistor, 3.9K ohm 5% 1/4W	0095-0920
R89	Resistor, 68 ohm 5% 1/4W CF	0095-0501
R90-93	Resistor, 75K ohm 5% 1/4W	0095-1230
C1	Capacitor, 100 pF 10V Cer.	0085-0749
C2-3, C6, C23, C39-40	Capacitor, 10uF 16V Elect.	0085-0020
C4, C15, C17, C22, C25, C30, C32	Capacitor, 0.1uF 12V Cer.	0096-4090

REF. DESIGNATION	DESCRIPTION	PART NUMBER
C5	Capacitor, 0.68uF 12V Poly.	0085-2640
C7	Capacitor, 100pF 12V Cer.	0096-3340
C8, C12, C14	Capacitor, 1uF 16V Elect.	0085-0007
C9	Capacitor, 2.2uF 12V Elect.	0097-2530
C10-11, C13	Capacitor, 0.01uF 12V Cer.	0096-2020
C16, C18, C24, C26	Capacitor, 470pF 12V Cer.	0096-3500
C20, C27	Capacitor, 0.05uF 12V Cer.	0096-4070
C21, 29	Capacitor, 470uF 12V Elect.	0097-2150
C33	Capacitor, 0.0022uF 12V Poly.	0096-1560
C34	Capacitor, 1000pF 12V Cer.	0096-3530
C35, C37	Capacitor, 33uF 12V Elect.	0097-2580
C36	Capacitor, 220uF 12V Elect.	0097-2130
C38	Capacitor, 330uF 12V Elect.	0097-2620
J1	Jack, External DC Adaptor	0089-0113
J2, J4	Jack, RCA (Line Out)	0089-0111
J3	Jack, Headphone	0089-0112
J5	Jack, 5-pin DIN	0089-0110
J6	Jack, 8-pin Header	0089-0032
	Stereo Cable	0089-0030
1	Keypad, Rubber	5281-2319
2	Transducer, Piezoelectric	0099-1390
3	Ribbon Cable	5281-4519
4	Housing Assy., Upper inc. Inlay	5281-9119
5	Drum Case Assy., Upper incl. Pad	5281-9149
6	Drum Case, Lower	5281-9169
7	Battery Tray Assy., incl. Contacts	5281-9139
	Spring, Conical (- battery contact)	5281-4379
	Contact, Battery (+ contact)	5281-4429
8	Support, LED, Short (Bass Drum)	5281-6459
9	Support, LED, Long	5281-6449
10	Knob, Volume and Tuning	5281-2599
11	Label, Keypad	5281-4259
12	Housing Assy., Lower incl. Battery Door and Label	5281-9109
13	Battery Door Assy., incl. foam	5281-9179
14	Label, Right (Headphone, Line Output)	5281-4249
15	Label, Left Side (DC Power, Accessory)	5281-4239
16	Foot Pad, Rubber	5281-2289
17	Screw, 7/16" (short)	0405-0466
18	Screw, 3/4" (long)	0405-0456
	Packing Carton, Individual	5281-9219
	Packing Material (Bubble Material)	5281-0660
	Instruction Book	5281-0920

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